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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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G. GREGORY SCHIVELY, ESQ.
HARNESS, DICKEY & PIERCE, P.L.C.
5445 CORPORATE DRIVE
TROY, MI 48098

EXAMINER	
EPPERSON, JON D	
ART UNIT	**PAPER NUMBER**
1639	

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/163,199	FUKUSHIMA ET AL.	
	Examiner	Art Unit	
	Jon D. Epperson	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7 and 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7 and 8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination (RCE)

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection (e.g., see 1/25/05 Response). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/24/04 has been entered. Claims 1, 7, 8 and 27 were pending. Applicants amended claim 1 and canceled claim 27. Therefore, claims 1, 7 and 8 are examined on the merits in this action.

Those sections of Title 35, US code, not included in the instant action can be found in previous office actions.

Withdrawn Objections/Rejections

2. All outstanding rejections are withdrawn in view of Applicants' arguments and/or amendments.

New Rejections

Claim Rejections - 35 USC § 103

3. Claims 1, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sangodkar et al. (Sangodkar, H.; Sukeerthi, S.; Srinivasa, R.S.; Lal, R.; Contractor, A.Q. "A Biosensor Array Based on Polyaniline" *Anal. Chem.* **1996**, 68, 779-783) (of record) and Lemmo et al. (Lemmo, A.V.; Fisher, J.T.; Geysen, H.M.; Rose, D.J. "Characterization of an Inkjet

Chemical Microdispenser for Combinatorial Library Synthesis" *Anal. Chem.* **1997**, 69, 543-551) (of record) and Newman et al. (Newman; J.D.; Turner, A.P.F. "Ink-jet printing for the fabrication of amperometric glucose biosensors" *Analytica Chimica Acta*, **1992**, *262*, 13-17) (IDS Ref. AR) and Trojanowicz et al. (Trojanowicz, M.; Krawczynski vel Krawczyk, T. "Electrochemical Biosensors based on enzymes immobilized in electropolymerized films" Chimika Chronika, New Series, ***1996***, 25, 235-249).

For ***claims 1***, Sangodkar et al. (see entire document) teach the manufacture of a biosensor array based on polyaniline, which reads on claim 1. For example, Sangodkar et al. teach the deposition of a polyaniline electro-conductive polymer thin film on the surface of an array of gold interdigitated microelectrodes on oxidized silicon wafers, which reads on claim 1 (e.g., see Sangodkar et al., abstract; see also figures 1-3 wherein the "two dimensional array" of IMPs are disclosed in figure 2 and the method for depositing the polyaniline thin film is shown in figure 3; see also page 780, column 2, last paragraph). Please note that the polyaniline conducting film is deposited in different regions of the two-dimensional sensor array (e.g., see figure 2) to produce a device that is specific to a group of chemicals (e.g., see abstract wherein it is shown that the device is specific for a group of chemicals including glucose). In the "glucose" embodiment the enzyme "glucose oxidase" was "absorbed" by the polymer (e.g., see page 780, column 2, last paragraph) (Please note that the "glucose oxidase" is an "aromatic molecule" because it contains many "aromatic" amino acids including, for example, 18 Phe residues, see

attached primary structure which shows that the aromatic molecules are an "inherent" feature of the glucose oxidase).

With respect to the limitation that the solution has a viscosity "of about 3 centipoise or less", it is noted that "[p]roducts of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Since the reference discloses a solution comprising applicants preferred "polyaniline" (e.g., see specification, page 7, line 12), this solution is deemed to have the properties applicants claim. "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). The Office does not have the facilities to make such a comparison and the burden is on the applicants to establish the difference. See *In re Best,* 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *Ex parte Gray*, 10 USPQ 2d 1922 1923 (PTO Bd. Pat. App. & Int.).

For ***claim 8***, Sangodkar et al. disclose poly-silicon thin film transistors (e.g., see Sangodkar et al., abstract, see also figure 2).

The prior art teachings of Sangodkar et al. differ from the claimed invention as follows:

For ***claim 1***, Sangodkar et al. are deficient in that they do not teach the use of inkjet technology to deposit the electro-conductive polymer. Sangodkar et al. only teach

the use of electrochemical deposition using a syringe (e.g., see Sangodkar et al., figure 3). In addition, Sangodkar et al. are deficient in that they do not teach the use of electro-conductive polymers like polymethylpyrrole. Sangodakar et al. only teach the use of "polyaniline" (e.g., see Sangodkar et al., Title).

For ***claim 7***, Sangodkar et al. are deficient in that they do not teach the use of a plastic substrate.

However, the combined teachings of Lemmo et al. and Newman et al. and Trojanowicz et al. disclose the following limitations that are deficient in Sangodkar et al.:

For ***claims 1***, Lemmo et al. (see entire document) teach the use of inkjet technology for the formation of combinatorial libraries including applications to biosensors (e.g., see Lemmo et al., abstract; see also page 544, column 1, paragraph 2, "Inkjet-type dispensing ... have been used in many areas of chemistry ... including fabrication of biosensors"). Furthermore, Lemmo et al. teach that piezoelectric devices may be used in the inkjet dispenser (e.g., see Lemmo, page 544, column 1, paragraph 2, "Inkjet-type dispensing, both solenoid and piezoelectric, have been used") and explicitly refer to Newman et al. as an example of a piezoelectric Inkjet dispenser (e.g., see Lemmo et al., page 544, column 1, reference 2 at bottom of column). Newman et al. teach an ink jet nozzle with a piezo-electric device for ejecting solution wherein an electric signal is used to deform the piezo-element (e.g., see Newman et al., page 14, column 1, "Ink-jet nozzle" section; see also figure 1). In addition, Trojanowicz et al. teach the use of "poly-N-methyl-pyrrole" electro-conducting polymers in biosensors (e.g., Trojanowicz et al., abstract).

For ***claim 7***, the combined teachings of Lemmo et al. and Newman et al. disclose a plastic substrate (e.g., see Newman et al., page 14, column 1, last paragraph wherein PVC is used as a substrate to make the electrodes).

It would have been obvious to one skilled in the art at the time the invention was made to make a biosensor array based on electro-conductive polymers as taught by Sangodkar et al. with the inkjet technology as disclosed by the combined teachings of Newman et al. and Lemmo et al. and the "polymethylpyrrole" electro-conducting polymer as taught by Trojanowicz et al. because Lemmo et al. explicitly state that inkjet technology is beneficial for producing combinatorial libraries for biosensors, which would encompass the biosensor disclosed by Sangodkar et al. (e.g., see Lemmo et al., page 544, column 1, paragraph 2, "Inkjet-type dispensing, both solenoid and piezoelectric, have been used in many areas of chemistry and science including fabrication of biosensors") and Trojanowicz et al. explicitly state that polymethylpyrrole can be used to replace polyaniline in biosensors, which would also encompass the polypyrrole biosensors disclosed by Sangodkar et al. (e.g., see Sangodkar et al., abstract wherein polymethylaniline is compared to polypyrrole). Furthermore, one of ordinary skill in the art would have been motivated to use the inkjet technology as taught by the combined teachings of Newman et al. and Lemmo et al. because Lemmo et al. explicitly state that inkjet technology has many advantages over the syringe based dispensing techniques disclosed by Sangodkar et al. (e.g., see Lemmo et al., page 544, column 1, paragraph 2, "The use of inkjet-type dispenser for delivering chemical reagents has several distinct advantages over syringe or pump-based pipette dispensing: (1) The

dispense process is a non-contact dispense ... (2) The dispense time is rapid ... (3) ... the mean time between failure is high ... (4) low cost"). In addition, one of ordinary skill in the art would have been motivated to use polymethylpyrrole to replace the polyaniline disclosed by Sangodkar et al. because Trojanowicz explicitly states that polymethylpyrrole is better than polyaniline (e.g., see Trojanowicz et al., figure 2).

Furthermore, one of ordinary skill in the art would have reasonably expected to be successful because Lemmo et al. explicitly state that inkjet technology can be successfully used to replace the syringe based methods disclosed in Sangodkar et al. (e.g., see Lemmo et al., page 544, column 1, paragraph 2). In addition, Trojanowicz et al. provide successful examples showing that polypyrrole can be used as a biosensor (e.g., see Trojanowicz et al., abstract and figures).

Response

4. Applicant's arguments directed to the above 35 U.S.C. § 103(a) rejection were fully considered (and are incorporated in their entirety herein by reference) but were not deemed persuasive for the following reasons. Please note that the above rejection has been modified from it original version to more clearly address applicants' newly amended and/or added claims and/or arguments.

[1] Applicants argue, "... the primary reference (Sangodkar) is not properly combinable with secondary references ... electrodeposition and potential cycling of Sangodkar would be lost if the film forming solution were to be deposited by ink-jet methods instead of by the disclosed syringe methods ... [thus] Sangodkar reference ... teaches away from using an ink-jet process" (e.g., see 11/24/04 Response, pages 5-6, especially page 6, paragraphs 1-2).

[2] Applicants argue, "The other secondary references ... are similarly deficient at provide motivation to modify Sangodkar ... Newman ... does not disclose depositing a film forming material. Lemmon is similarly inapt" (e.g., see 11/24/04 Response, page 6, paragraphs 2-3).

[3] Applicants argue, "Even if the references are properly combinable ... the references when combined do not contain all of the limitations of the current claims. For example, none of the references discloses the claimed viscosity" (e.g., see 11/24/04 Response, page 7, first full paragraph).

[4] Applicants argue, "Claim 1 has been amended to remove polypyrrole ... none of the references teach or suggest an electroconductive polymer [in the currently amended claims]" (e.g., see 11/24/04 Response, page 7, last paragraph).

This is not found persuasive for the following reasons:

[1] The Examiner respectfully disagrees. The use of a "syringe" for electrochemical polymerization (e.g., see Sangodkar et a., figure 3) represents a "design choice" not a "teaching away" as purported by Applicants. A person of skill in the art would readily understand that an alternative setup would be required for electrochemical polymerization using inkjet technology as exemplified in the secondary references (e.g., see Trojanowicz et al., page 237, Apparatus section; see also page 238, Procedures for the biosensors preparation section; see also Newman). Thus, a person of skill in the art would make the necessary adjustments when switching from needle to inkjet technologies.

[2] In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or

modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Here, a person of skill in the art would have been motivated to use the inkjet technology as taught by the combined teachings of Newman et al. and Lemmo et al. because Lemmo et al. explicitly state that inkjet technology has many advantages over the syringe based dispensing techniques disclosed by Sangodkar et al. (e.g., see Lemmo et al., page 544, column 1, paragraph 2, "The use of inkjet-type dispenser for delivering chemical reagents has several distinct advantages over syringe or pump-based pipette dispensing: (1) The dispense process is a non-contact dispense ... (2) The dispense time is rapid ... (3) ... the mean time between failure is high ... (4) low cost"). In addition, one of ordinary skill in the art would have been motivated to use polymethylpyrrole to replace the polyaniline disclosed by Sangodkar et al. because Trojanowicz explicitly states that polymethylpyrrole is better than polyaniline (e.g., see Trojanowicz et al., figure 2).

In addition, in response to applicant's arguments against the Newman reference individually (e.g., Newman and/or Lemmo do not disclose depositing a film forming material; Lemmon does not deal with making a biosensor), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

[3] "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the ***applicant has the burden of showing that they are not***." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). The Office does not have the facilities to make such a comparison and the burden is on the applicants to establish the difference. See *In re Best,* 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *Ex parte Gray*, 10 USPQ 2d 1922 1923 (PTO Bd. Pat. App. & Int.). Here, Applicants have not provided any evidence that the required viscosity has not been disclosed by the combined references.

[4] The new Trojanowicz et al. reference in the newly amended rejection (see above) teaches Applicants' currently claimed polymethylpyrrole (e.g., see Trojanowicz et al., abstract).

Accordingly, the 35 U.S.C. § 103(a) rejection cited above is hereby maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon D Epperson whose telephone number is (571) 272-0808. The examiner can normally be reached Monday-Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571) 272-0811. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jon D. Epperson, Ph.D.
May 12, 2005

BENNETT CELSA
PRIMARY EXAMINER